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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/975,969	10/15/2001	Takanori Suzuki	107348-00151	1045

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ARENT FOX KINTNER PLOTKIN & KAHN, PLLC
Suite 400
1050 Connecticut Avenue, N.W.
Washington, DC 20036-5339

EXAMINER

CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 03/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

Office Action Summary

Application No.

09/975,969

Applicant(s)

SUZUKI ET AL.

Examiner

Jonathan S. Crepeau

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5 and 7 is/are rejected.
- 7) ☒ Claim(s) 2,4,6 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 1-8. The §102(b) rejection of claims 1 and 5 has been withdrawn as it is believed that the Arnold et al. reference is not anticipatory. However, the claims are newly rejected under 35 USC §103 herein. As such, this action is non-final.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnold et al (U.S. Patent 6,195,999) in view of Tsutsumi et al (U.S. Patent 5,366,820).

Regarding claims 1 and 5, Arnold et al. teach a system comprising a fuel cell (12), a first means for storing hydrogen (22) having a first hydrogen storage material, and a second means for storing hydrogen (22') having a second hydrogen storage material (see Fig. 3). A catalytic combustor (42) heats the first and second hydrogen storage vessels via conduits 44 and 44' (see Fig. 3; col. 3, line 63). The first and second hydrogen storage vessels supply hydrogen to the catalytic combustor via conduit 16, the fuel cell, and then conduit 19 (see Fig. 3). Waste heat from the fuel cell is also used to heat the hydrogen storage vessels via conduit 32 (see Fig. 3).

The reference does not expressly teach that the second hydrogen absorbing material has a hydrogen release temperature that is lower than that of the first hydrogen absorbing material, as recited in claims 1 and 5.

Tsutsumi et al. is directed to a fuel cell system having two hydrogen storage devices (65, 66) (see Fig. 13). In column 13, line 53, the reference teaches that the first device (66) contains an alloy which desorbs hydrogen at a higher temperature than the alloy of the second device (65).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Tsutsumi et al. to use alloys having different hydrogen desorption temperatures in the system of Arnold et al. In column 5, line 1, Tsutsumi et al. teach that "[i]n the above construction, since the hydrogen gas supply is smooth from the start, the fuel cell system is operated smoothly from the start." Thus, the artisan would be motivated to use alloys having different desorption temperatures in the system of Arnold et al. in hopes of smoothly starting the fuel cell.

4. Claims 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnold et al. in view of Tsutsumi et al. as applied to claims 1 and 5 above, and further in view of Snow et al (U.S. Patent 6,589,312).

Arnold et al. do not expressly teach that the first hydrogen absorbing material is an Mg system hydrogen storage alloy, as recited in claims 3 and 7.

Snow et al. is directed to nanoparticles for hydrogen storage (see abstract). In column 6, line 16, the reference teaches that Mg_2Ni , Mg_2Cu , and Mg materials may be used.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Snow et al. to use Mg-based alloys in the hydrogen storage devices of Arnold et al. In column 5, line 41, Snow et al. teach that “[m]agnesium hydrides are popular because magnesium is a relatively cheap and abundant metal and can absorb large amounts of hydrogen for its weight.” Accordingly, the artisan would be motivated to use Mg-based alloys in the hydrogen storage devices of Arnold et al.

Allowable Subject Matter

5. Claims 2, 4, 6, and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter:

Dependent claims 2 and 6 each recite, among other features, that the system is configured such that the first hydrogen storage vessel (means) supplies hydrogen to the second hydrogen storage vessel (means) during startup. Arnold et al., the closest prior art, does not teach or fairly suggest this subject matter. In Arnold et al., hydrogen is supplied from the first and second devices (22, 22') to the anode of the fuel cell, but is replenished only from an external source (50) (see Figure 3; column 4, line 9; column 5, line 64 et seq.). The system is not configured

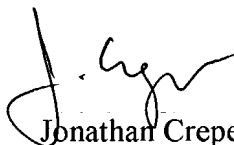
Art Unit: 1746

such that one storage device may supply hydrogen to the other during startup, nor would such a modification be obvious to a person of ordinary skill in the art. Accordingly, claims 2, 4, 6, and 8 contain allowable subject matter.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (571) 272-1302. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.


Jonathan Crepeau
Patent Examiner
Art Unit 1746
March 1, 2004